

ELECTRONIC DATA DELIVERABLE FORMAT REQUIREMENTS FOR RCRA/CERCLA DOCUMENTS (U)

I. Electronic Data Deliverable Format Requirements for Data Summary Reports (U)

The purpose of this document is to specify the version and format requirements for electronic data deliverables (EDD) to be used in the preparation of regulatory documents such as, but not limited to, the RCRA, RFI/RI, Baseline Risk Assessment (BRA), Feasibility, and Treatability Study Reports.

Any revisions to this document must be coordinated with the Environmental Monitoring Section (EMS) of the Environmental Protection Department. EMS typically provides the services associated with data management which is the subject of this document. Other SRS groups or subcontractors performing these activities for Environmental Restoration Division (ERD) would also be required to follow this document. This document does not instruct EMS, other SRS groups, or subcontractors as to how to perform their data management activities. This document specifies the EDD version and format requirements for analytical data which are provided in support of the ERD program. Providing the files in multiple versions and formats removes the need for extensive data management on the part of SRS and subcontractor resources.

The required versions are as follows:

1. Version 1 - Full Data Set will be used by SRS and subcontractor resources who want to double check the screening process applied by EMS in order to produce the Production Data Set. This version will also be used by individuals who are trying to determine the cause of any anomalies in the data set. The EDD format for the Full Data Set is described in the Environmental Geochemistry Group Operating Handbook (EGG-OH) sections 2.410 and 3.320, with modifications discussed in the Data Request Process section of this document.
2. Version 2 - Production Data Set will be used by both SRS and subcontractor personnel in the processing of data in support of regulatory documents. The EDD format for the Production Data Set is described in EGG-OH section 2.530, with modifications discussed in the Data Request Process section of this document.
3. Version 3 - FFA Data Set will be used to provide data to the regulators in the EDD format described in Appendix J of the Federal Facility Agreement (FFA).
4. Version 4 - Statistical Summary Report will be used to facilitate the production of Baseline Risk Assessment (BRA) documents, and is a statistical summary of the data contained in the Full Data Set. The Statistical Summary Report (SSR) will be a subsection of the DSR and the associated EDD is defined in the Data Request Process section of this document.

Terms and Definitions

ASCII File - A file containing electronic data in the ASCII format

BRA - Baseline Risk Assessments document the analysis of the potential for adverse effects associated with exposure to contaminants likely to be present at the unit. Baseline risks are those risks to human health and the environment that can be anticipated to be present in the absence of any remedial efforts or institutional controls for the unit

CERCLA - Comprehensive Environmental Response Compensation and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act (SARA) of 1986

COC - Constituent of concern

ERD - Environmental Restoration Division

EGG-OH - Environmental Geochemistry Group Operating Handbook

EMS - Environmental Monitoring Section

Excel Spreadsheet - A file containing data and other information that is compatible with the computer program known as "Excel"

Feasibility Study - A report documenting the technical evaluation of various remediation options.

FFA - Federal Facility Agreement

IFF - Interchange File Format. This is the EPA Region IV standardized electronic data deliverable format.

Rads - Radionuclide constituents

RCRA - Resource Conservation and Recovery Act of 1976 as amended by the Hazardous and Solid Waste Amendments (HSWA) of 1984

RFI/RI - RFI is the RCRA term standing for RCRA Facility Investigation program. RI is the CERCLA term standing for Remedial Investigation program. When the ERD program addresses both, the terms are combined

SSR - Statistical Summary Report

SVOCs - Semivolatile organic compounds

Treatability Study - A report documenting the technical evaluation of various options for the treatment of unit contaminants

VOCs - Volatile organic compounds

Data Request Process

A. Data to be used in the preparation of regulatory documents are to be requested from EMS, or the group responsible for analytical services supporting ERD RCRA/CERCLA programs. A written request should be sent to the responsible organization, either by letter or using an electronic mail system (e-mail), which specifies the EDD requirements. If the project is split into multiple phases, then the request should indicate if only combined document delivery is required or if multiple deliveries are required for the various phases.

B. Data files provided to ERD in support of RCRA/CERCLA projects shall be provided as described in the following four different EDD versions:

(1) **Version 1 - Full Dataset**

This version will contain all of the AN95 fields for the data set, and it will include all quality assurance/quality control results, including the laboratory duplicates, matrix spike duplicates, matrix spikes, field duplicates, and blanks. This data set will also include the station data files, so the coordinates for each sample location are readily available. The file will include the ERD sample location identifier and the full analyte name will replace the analyte code for each line of data. This information will be provided in two formats, the usual flat ASCII format and also in an Excel spreadsheet format.

(2) **Version 2 - Production Dataset**

This version of data will be a subset of the version 1 dataset. It will be used for the production of the exposure group concentrations for the RFI/RI, BRA and other regulatory documents. The specific fields which shall be included by the responsible organization include the following:

- ERD sample location identifier
- Station coordinates
- Depth interval for each sample
- Sample date
- Analytical suite (VOC, SVOC, metals, rads, if any)
- Full analyte name
- Method detection limit
- Practical quantitation limit
- Counting uncertainty for radionuclides
- Result qualifier
- Result
- Unit

The specific fields which shall be excluded by the responsible organization are listed below:

- The COC number
- The analyte code
- All records for rejected results ("R" result qualifiers)
- All Field and Lab QC results including the surrogate spikes, matrix spikes, matrix spike duplicates, blank spikes, blank spike duplicates, lab duplicates, lab replicates, field splits, field duplicates, field rinsate blanks, field blanks, and trip blanks
- In the event a sample is re-analyzed by the laboratory include the re-analyzed result only. (However, the data validator needs to evaluate the results for diluted and non-diluted samples to determine the best single analytical result.)
- All calibration data, including standards, blanks, and all interference check samples
- All Tentatively identified compounds (TICs)
- The analysis qualifier column

The file will be provided both as an ASCII file and as an Excel spreadsheet.

(3) Version 3 - FFA Data Set

This version will be provided electronically in the EPA Region IV Interchange File Format (IFF) as described in Appendix J of the FFA. The EDD will be accompanied by a data dictionary and a report identifying what data set is being supplied, the media of delivery, and a description of what is contained in the data package. This data dictionary and report will be provided both on disk and in hard copy.

(4) Version 4 - Statistical Summary Report

This report will be a subsection of the DSR and the data will be provided electronically in an Excel spreadsheet as determined for each project by the project team. Attachment I is an example of the directions provided to generate the Statistical Summary Report. The following fields are to be generated for each subgroup determined by the project team:

- Analyte
- Units
- Soil Interval
- Frequency of Detection ("U" qualified)
- Frequency of Estimated Data ("J" qualified)

- Method Detection Limit
- Minimum Detection
- Maximum Detection
- Average Result
- Distribution
- 95% UCL
- Standard Deviation
- Log Transform
- Exposure Concentration
- Two Times Background Concentration

C. ERD Records Management will use the ERD Filing Facility as the central point for storage of the data disks. A copy of each of the versions is to be provided to the ERD records management center for filing. This provides centralized tracking and management of the files.

References

Corrective Action Report, "Improper Analysis of Data Qualifiers", 95-CAR-21-0001, 12/28/95

Corrective Action Report, "Environmental Data", 95-CAR-21-0001, Rev 1, 1/10/96

Root Cause Analysis Results for Corrective Action Report, 95-CAR-21-001, 3/7/96

Quarterly Status for CAR: 95-CAR-21-001, Rev 1, dated 4/16/96 by John Hart

WSRC-05-94-42, FFA Appendix J, Data Management Plan

Attachments

- Attachment I: Example of Statistical Summary Report Request: Request for Analytical Data for the SRL Seepage Basins (U).
- Attachment II: Example of Statistical Summary Report: DO-E97-12-03, TNX New Seepage Basin (TNXNSB) Statistical Summary Report and Excel Files.

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Electronic Data Deliverable Format Requirements
for Data Summary Sheets

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March 20, 1998

ESH-EMS-980067
6316.980320.005

Mr. Robert Craig
Environmental Geochemistry Group
Environmental Protection Department
Westinghouse Savannah River Company
Aiken, South Carolina 29808-1001

REFERENCE: **Contract No. AB60294N, Subcontract No. SAIC 01027, Environmental Data Management and Project Reporting Services**

DO-E97-12-03, TNX New Seepage Basin (TNXNSB) Statistical Summary Report and Excel Files

Dear Mr. Craig,

Enclosed are three bound copies of the Statistical Summary Report for the TNX New Seepage Basin (TNXNSB) RFI/RI project. Also provided are three diskettes containing the summary statistics in Excel format. This letter and its enclosures were prepared by Science Applications International Corporation (SAIC). If you have any questions concerning this deliverable, please feel free to call me at (706) 724-5589.

Sincerely,

SCIENCE APPLICATIONS INTERNATIONAL CORPORATION

Allen F. Volesky

enclosures

cc: TNXNSB Project File (Kathie Spooner)
 EGG Program File (Brenda Walker)
 David Nix - WSRC
 Dave Amick - SAIC, Augusta
 Martha Turpin - SAIC, Oak Ridge
 Horace Bledsoe - ExR, Augusta
 Contract Files
 Central Records Facility

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| Analysis | Result Units | Proportion Detected | Proportion "J" Qualified | Average MDL | Minimum Detect | Maximum Detect | Average Result | Std. Dev. | 2 X Background |
|--------------------------------------|--------------|---------------------|--------------------------|-------------|----------------|----------------|----------------|-----------|----------------|
| Pesticides/PCBs | | | | | | | | | |
| Aldrin | mg/kg | 1/ 9 | 0/ 9 | 0.0010 | 0.0033 | 0.0033 | 0.0008 | 0.0009 | 0.00159 |
| Dieldrin | mg/kg | 2/ 9 | 1/ 9 | 0.0019 | 0.0013 | 0.0068 | 0.0017 | 0.0019 | 0.0033 |
| E | | | 9 | 0.0019 | 0.0040 | 0.0040 | 0.0013 | 0.0010 | 0.00262 |
| E | | | | | | | | | 14 |
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| | | | | | | | | | 10212 |
| | | | | | | | | | |
| | | | | | | | | | |
| Ammonia nitrogen | mg/kg | 9/ 9 | 1/ 9 | 0.55 | 7.75 | 36.70 | 21.00 | 9.93 | 42 |
| Total Phosphates (as P) | mg/kg | 9/ 9 | 0/ 9 | 0.50 | 169.00 | 330.00 | 228.00 | 53.19 | 456 |
| Radionuclides | | | | | | | | | |
| Actinium-228 | pCi/g | 9/ 9 | 0/ 9 | 0.0200 | 0.3420 | 0.9520 | 0.5500 | 0.2371 | 1.1000 |
| Cesium-137 | pCi/g | 9/ 9 | 0/ 9 | 0.0068 | 0.0599 | 0.2800 | 0.1410 | 0.0665 | 0.2820 |
| Curium-242 | pCi/g | 1/ 9 | 0/ 9 | 0.0570 | 0.1160 | 0.1160 | 0.0362 | 0.0316 | 0.0724 |
| Curium-243/244 | pCi/g | 3/ 8 | 0/ 8 | 0.0781 | 0.3300 | 0.4040 | 0.1690 | 0.1746 | 0.3380 |
| Gross Alpha | pCi/g | 9/ 9 | 0/ 9 | 1.7278 | 4.8700 | 14.3000 | 8.9900 | 3.5771 | 17.9800 |
| Lead-212 | pCi/g | 9/ 9 | 0/ 9 | 0.0106 | 0.3370 | 1.0300 | 0.5760 | 0.2740 | 1.1520 |
| Non-volatile Beta | pCi/g | 9/ 9 | 0/ 9 | 3.0322 | 6.5200 | 13.0000 | 9.3300 | 2.1905 | 18.6600 |
| Plutonium-238 | pCi/g | 1/ 9 | 0/ 9 | 0.0439 | 1.5300 | 1.5300 | ~0.1890 | 0.5028 | 0.3780 |
| Plutonium-239/240 | pCi/g | 2/ 9 | 0/ 9 | 0.0194 | 0.0327 | 0.1170 | 0.0243 | 0.0356 | 0.0486 |
| Rubassium-40 | pCi/g | 9/ 9 | 0/ 9 | 0.0524 | 1.3700 | 3.0500 | 2.2500 | 0.5776 | 4.3000 |
| Radium-226 | pCi/g | 9/ 9 | 0/ 9 | 0.0468 | 0.3510 | 0.9890 | 0.6680 | 0.1938 | 1.3360 |
| Radium-228 | pCi/g | 9/ 9 | 0/ 9 | 0.0900 | 0.3340 | 1.0200 | 0.7340 | 0.2399 | 1.4680 |
| Thorium-228 | pCi/g | 9/ 9 | 0/ 9 | 0.0399 | 0.4680 | 0.9810 | 0.6910 | 0.2036 | 1.3820 |
| Thorium-230 | pCi/g | 9/ 9 | 0/ 9 | 0.0178 | 0.4030 | 0.8790 | 0.5910 | 0.1336 | 1.1820 |
| Thorium-232 | pCi/g | 9/ 9 | 0/ 9 | 0.0161 | 0.4370 | 0.9450 | 0.6590 | 0.1920 | 1.3180 |
| Thorium-234 | pCi/g | 9/ 9 | 0/ 9 | 0.2924 | 0.2780 | 1.0500 | 0.6090 | 0.2540 | 1.2180 |
| Uranium-223/234 | pCi/g | 9/ 9 | 0/ 9 | 0.0222 | 0.3750 | 0.9080 | 0.5710 | 0.2126 | 1.1420 |
| Uranium-235 | pCi/g | 9/ 9 | 0/ 9 | 0.0171 | 0.0165 | 0.1310 | 0.0490 | 0.0373 | 0.0980 |
| Radionuclides, continued | | | | | | | | | |
| Uranium-238 | pCi/g | 9/ 9 | 0/ 9 | 0.0187 | 0.3100 | 0.7360 | 0.4930 | 0.1863 | 0.9860 |
| TAL Inorganics | | | | | | | | | |
| Aluminum | mg/kg | 9/ 9 | 2/ 9 | 1.88 | 1990.00 | 7190.00 | 3360.00 | 1721.06 | 6720 |
| Barium | mg/kg | 9/ 9 | 0/ 9 | 0.02 | 19.30 | 62.10 | 38.50 | 15.82 | 77 |
| Beryllium | mg/kg | 9/ 9 | 9/ 9 | 0.01 | 0.13 | 0.41 | 0.23 | 0.10 | 0.468 |
| Boron, total recoverable | mg/kg | 5/ 9 | 5/ 9 | 0.96 | 0.62 | 1.30 | 0.66 | 0.26 | 1.316 |
| Cadmium | mg/kg | 1/ 9 | 0/ 9 | 0.01 | 0.39 | 0.39 | 0.05 | 0.13 | 0.0964 |
| Calcium | mg/kg | 9/ 9 | 0/ 9 | 0.77 | 37.60 | 249.00 | 113.00 | 66.58 | 226 |
| Chromium | mg/kg | 8/ 9 | 4/ 9 | 0.04 | 1.77 | 8.40 | 3.37 | 2.30 | 6.74 |
| Cobalt | mg/kg | 9/ 9 | 1/ 9 | 0.03 | 0.49 | 4.85 | 1.80 | 1.50 | 3.6 |
| Copper | mg/kg | 8/ 9 | 1/ 9 | 0.07 | 1.14 | 5.98 | 2.63 | 1.81 | 5.26 |
| Cyanide | mg/kg | 1/ 9 | 1/ 9 | 0.17 | 0.09 | 0.09 | 0.08 | 0.00 | 0.1674 |
| Iron | mg/kg | 9/ 9 | 8/ 9 | 0.43 | 1480.00 | 12500.00 | 3710.00 | 3386.18 | 7420 |
| Lead | mg/kg | 9/ 9 | 8/ 9 | 0.03 | 2.24 | 7.79 | 4.22 | 1.69 | 8.44 |
| Magnesium | mg/kg | 9/ 9 | 0/ 9 | 0.17 | 50.40 | 146.00 | 108.00 | 31.67 | 216 |
| Manganese | mg/kg | 9/ 9 | 4/ 9 | 0.05 | 64.20 | 868.00 | 378.00 | 236.38 | 756 |
| | mg/kg | 9/ 9 | 4/ 9 | 0.02 | 0.01 | 1.02 | n 15 | n 22 | |
| | mg/kg | 7/ 9 | 3/ 9 | 0.11 | 0.98 | 2. | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| Zinc | mg/kg | 9/ 9 | 4/ 9 | 0.05 | 3.49 | 8.08 | 5.48 | | |
| TCL Semivolatile | | | | | | | | | |
| Benzo(b)fluoranthene | mg/kg | 1/ 9 | 0/ 9 | 0.0003 | 0.0076 | 0.0076 | 0.0010 | 0.0025 | 0.001978 |
| Benzoic acid | mg/kg | 7/ 9 | 0/ 9 | 0.0073 | 0.2640 | 1.3600 | 0.4290 | 0.4172 | 0.858 |
| Di-n-butyl phthalate | mg/kg | 1/ 9 | 1/ 9 | 0.0040 | 0.0234 | 0.0234 | 0.0044 | 0.0071 | 0.00876 |
| TCL Volatiles | | | | | | | | | |
| 1,1,1-Trichloroethane | mg/kg | 5/ 9 | 0/ 9 | 0.00018 | 0.00009 | 0.00057 | 0.00019 | 0.00017 | 0.00038 |
| 2-Butanone (MEK) | mg/kg | 2/ 9 | 1/ 9 | 0.00212 | 0.00034 | 0.00202 | 0.00109 | 0.00042 | 0.00218 |
| Acetone | mg/kg | 7/ 9 | 3/ 9 | 0.00224 | 0.00374 | 0.01750 | 0.00640 | 0.00503 | 0.0128 |
| TCL Volatiles, continued | | | | | | | | | |
| Carbon disulfide | mg/kg | 2/ 9 | 2/ 9 | 0.00216 | 0.00022 | 0.00029 | 0.00090 | 0.00036 | 0.001792 |
| Chloroform | mg/kg | 5/ 9 | 2/ 9 | 0.00024 | 0.00005 | 0.00009 | 0.00009 | 0.00003 | 0.00018 |
| Dichloromethane (Methylene chloride) | mg/kg | 3/ 9 | 0/ 9 | 0.00025 | 0.00161 | 0.00337 | 0.00088 | 0.00121 | 0.001754 |

| Analysis | Result Units | Proportion Detected | Proportion "J" Detected | Average MDL | Minimum | Maximum Detect | Average Result | Std. Dev. | Dist. | 95% UCL of Mean | Exposure Concentration |
|-----------------------------|--------------|---------------------|-------------------------|-------------|----------|----------------|----------------|-----------|-------|-----------------|------------------------|
| Pesticides/PCBs | | | | | | | | | | | |
| Aroclor 1260 | mg/kg | 1/ 6 | 0/ 6 | 0.0009 | 0.0200 | 0.0200 | 0.0037 | 0.0080 | D | 0.0103 | 0.0103 |
| Endrin | mg/kg | 1/ 6 | 1/ 6 | 0.0003 | 0.0033 | 0.0033 | 0.0007 | 0.0013 | D | 0.0017 | 0.0017 |
| p,p'-DDE | mg/kg | 1/ 6 | 1/ 6 | 0.0001 | 0.0038 | 0.0038 | 0.0007 | 0.0015 | D | 0.0019 | 0.0019 |
| Physical Parameters | | | | | | | | | | | |
| Nitrate-Nitrite as Nitrogen | mg/kg | 6/ 6 | 1/ 6 | 0.0680 | 0.7340 | 6.3300 | 3.5600 | 2.1343 | N | 5.3100 | 5.3100 |
| Radionuclides | | | | | | | | | | | |
| Actinium-228 | pCi/g | 6/ 6 | 0/ 6 | 0.1089 | 0.3860 | 1.8800 | 1.1800 | 0.4979 | N | 1.5900 | 1.5900 |
| Cesium-137 | pCi/g | 6/ 6 | 0/ 6 | 0.0325 | 0.0364 | 0.1360 | 0.0824 | 0.0433 | L | 0.1970 | 0.1360 |
| Gross Alpha | pCi/g | 6/ 6 | 4/ 6 | 3.9600 | 8.2000 | 56.3000 | 26.7000 | 17.1519 | L | 83.1000 | 56.3000 |
| Lead-212 | pCi/g | 6/ 6 | 0/ 6 | 0.0485 | 0.4690 | 2.0500 | 1.2300 | 0.5150 | N | 1.6600 | 1.6600 |
| Non-volatile Beta | pCi/g | 6/ 6 | 0/ 6 | 5.7567 | 6.0200 | 43.3000 | 19.7000 | 13.3190 | L | 74.4000 | 43.3000 |
| Plutonium-239/240 | pCi/g | 1/ 6 | 0/ 6 | 0.1600 | 0.0468 | 0.0468 | 0.0853 | 0.1400 | D | 0.2010 | 0.0468 |
| Potassium-40 | pCi/g | 6/ 6 | 0/ 6 | 0.3096 | 1.1300 | 4.1000 | 2.5800 | 1.1243 | N | 3.5000 | 3.5000 |
| Radium-226 | pCi/g | 6/ 6 | 0/ 6 | 0.0831 | 0.6910 | 3.6300 | 1.6500 | 1.1495 | L | 5.0300 | 3.6300 |
| Radium-228 | pCi/g | 5/ 5 | 0/ 5 | 0.1462 | 1.1600 | 2.0300 | 1.4300 | 0.3448 | L | 1.8600 | 1.8600 |
| Thorium-228 | pCi/g | 5/ 6 | 0/ 6 | 0.4213 | 0.6020 | 1.9800 | 1.0400 | 0.6325 | N | 1.5600 | 1.5600 |
| Thorium-230 | pCi/g | 6/ 6 | 0/ 6 | 0.2058 | 0.3340 | 1.4800 | 0.8970 | 0.4201 | N | 1.2400 | 1.2400 |
| Thorium-232 | pCi/g | 5/ 6 | 0/ 6 | 0.2180 | 0.4870 | 1.4400 | 0.8140 | 0.5256 | N | 1.2500 | 1.2500 |
| Thorium-234 | pCi/g | 6/ 6 | 0/ 6 | 1.2025 | 2.1100 | 8.4600 | 4.5200 | 2.6481 | N | 6.7000 | 6.7000 |
| Uranium-233/234 | pCi/g | 6/ 6 | 0/ 6 | 0.0184 | 0.9890 | 3.6000 | 2.2600 | 1.1087 | L | 5.1500 | 3.6000 |
| Uranium-235 | pCi/g | 6/ 6 | 0/ 6 | 0.0141 | 0.0705 | 0.2550 | 0.1640 | 0.0790 | L | 0.3710 | 0.2550 |
| Uranium-238 | pCi/g | 6/ 6 | 0/ 6 | 0.0141 | 1.6800 | 6.6700 | 4.0500 | 2.0420 | N | 5.7300 | 5.7300 |
| TAL Inorganics | | | | | | | | | | | |
| Aluminum | mg/kg | 6/ 6 | 0/ 6 | 1.88 | 11200.00 | 38300.00 | ##### | 10275.41 | L | 44600.00 | 38300.00 |
| Arsenic | mg/kg | 6/ 6 | 0/ 6 | 0.15 | 7.82 | 44.10 | 18.90 | 13.21 | L | 51.50 | 44.10 |
| Barium | mg/kg | 6/ 6 | 0/ 6 | 0.02 | 73.00 | 592.00 | 345.00 | 241.72 | N | 543.00 | 543.00 |
| Beryllium | mg/kg | 6/ 6 | 6/ 6 | 0.01 | 0.25 | 0.37 | 0.32 | 0.05 | L | 0.38 | 0.37 |

| Analysis | Result Units | Proportion Detected | Proportion "J" Detected | Average MDL | Minimum Detect | Maximum Detect | Average Result | Std. Dev. | Dist. of Mean | 95% UCL | Exposure Concentration |
|--------------------------------------|--------------|---------------------|-------------------------|-------------|----------------|----------------|----------------|-----------|---------------|-----------|------------------------|
| Cadmium | mg/kg | 4/ 6 | 1/ 6 | 0.01 | 0.20 | 3.00 | 1.35 | 1.43 | D | 2.53 | 2.53 |
| Calcium | mg/kg | 6/ 6 | 0/ 6 | 0.77 | 2940.00 | 21500.00 | ##### | 6920.92 | L | 42700.00 | 21500.00 |
| Chromium | mg/kg | 6/ 6 | 0/ 6 | 0.04 | 45.90 | 883.00 | 219.00 | 326.41 | X | 487.00 | 487.00 |
| Cobalt | mg/kg | 6/ 6 | 0/ 6 | 0.03 | 6.60 | 55.90 | 19.30 | 18.21 | L | 70.40 | 55.90 |
| TAL Inorganics, continued | | | | | | | | | | | |
| Copper | mg/kg | 6/ 6 | 0/ 6 | 0.07 | 160.00 | 1520.00 | 503.00 | 511.83 | L | 2150.00 | 1520.00 |
| Cyanide | mg/kg | 1/ 6 | 0/ 6 | 0.22 | 3.20 | 3.20 | 0.63 | 1.26 | D | 1.66 | 1.66 |
| Iron | mg/kg | 6/ 6 | 6/ 6 | 0.43 | 21800.00 | 203000.00 | ##### | 63154.83 | L | 349000.00 | 203000.00 |
| Lead | mg/kg | 6/ 6 | 0/ 6 | 0.03 | 19.70 | 216.00 | 107.00 | 84.42 | L | 932.00 | 216.00 |
| Magnesium | mg/kg | 6/ 6 | 0/ 6 | 0.17 | 669.00 | 7210.00 | 4030.00 | 2626.14 | N | 6190.00 | 6190.00 |
| Manganese | mg/kg | 6/ 6 | 0/ 6 | 0.05 | 5580.00 | 46400.00 | ##### | 15371.95 | L | 100000.00 | 46400.00 |
| Mercury | mg/kg | 6/ 6 | 0/ 6 | 0.02 | 0.92 | 4.00 | 2.17 | 1.38 | N | 3.30 | 3.30 |
| Nickel | mg/kg | 6/ 6 | 0/ 6 | 0.11 | 2100.00 | 17800.00 | 7430.00 | 5836.10 | L | 43300.00 | 17800.00 |
| Potassium | mg/kg | 6/ 6 | 0/ 6 | 0.29 | 380.00 | 1770.00 | 974.00 | 478.86 | L | 2180.00 | 1770.00 |
| Selenium | mg/kg | 5/ 6 | 0/ 6 | 0.07 | 2.28 | 8.63 | 3.61 | 2.91 | N | 6.00 | 6.00 |
| Silver | mg/kg | 6/ 6 | 0/ 6 | 0.03 | 1.02 | 19.80 | 8.98 | 7.02 | N | 14.80 | 14.80 |
| Sodium | mg/kg | 6/ 6 | 0/ 6 | 1.46 | 2270.00 | 19800.00 | ##### | 6577.57 | N | 17400.00 | 17400.00 |
| Thallium | mg/kg | 6/ 6 | 0/ 6 | 0.13 | 7.25 | 55.00 | 25.50 | 17.50 | L | 104.00 | 55.00 |
| Vanadium | mg/kg | 6/ 6 | 0/ 6 | 0.02 | 3.72 | 49.50 | 13.00 | 17.98 | X | 27.70 | 27.70 |
| Zinc | mg/kg | 6/ 6 | 0/ 6 | 0.05 | 157.00 | 892.00 | 473.00 | 259.47 | L | 1330.00 | 892.00 |
| TCL Semivolatiles | | | | | | | | | | | |
| Benzo(b)fluoranthene | mg/kg | 1/ 6 | 0/ 6 | 0.00033 | 0.67000 | 0.67000 | 0.11200 | 0.27346 | D | 0.33700 | 0.33700 |
| Bis(2-ethylhexyl) phthalate | mg/kg | 6/ 6 | 0/ 6 | 0.00699 | 2.30000 | 18.10000 | 6.23000 | 5.94727 | L | 23.90000 | 18.10000 |
| TCL Volatiles | | | | | | | | | | | |
| Acetone | mg/kg | 2/ 6 | 0/ 6 | 0.00224 | 0.03860 | 0.06930 | 0.01870 | 0.02896 | D | 0.04260 | 0.04260 |
| Benzene | mg/kg | 4/ 6 | 1/ 6 | 0.00025 | 0.00254 | 0.10700 | 0.02590 | 0.04308 | D | 0.06130 | 0.06130 |
| Dichloromethane (Methylene chloride) | mg/kg | 1/ 6 | 0/ 6 | 0.00025 | 0.04730 | 0.04730 | 0.00799 | 0.01926 | D | 0.02380 | 0.02380 |
| Ethylbenzene | mg/kg | 1/ 6 | 1/ 6 | 0.00023 | 0.00079 | 0.00079 | 0.00023 | 0.00028 | D | 0.00046 | 0.00046 |

| Analysis | Result Units | Proportion Detected | Proportion "J" Detected | Average MDL | Minimum Detect | Maximum Detect | Average Result | Std. Dev. | Dist. 95% | UCL | Exposure of Mean | Concentration |
|-----------------|--------------|---------------------|-------------------------|-------------|----------------|----------------|----------------|-----------|-----------|---------|------------------|---------------|
| Xylenes (total) | mg/kg | 1/ 6 | 0/ 6 | 0.00042 | 0.00307 | 0.00307 | 0.00069 | 0.00117 | D | 0.00165 | 0.00165 | |

Distribution Codes: L-distribution most similar to lognormal.
 N-distribution most similar to normal.
 X-distribution significantly different from normal and lognormal.
 D-distribution not determined because the number of detects was less than half the total number of samples.
 Z-distribution with negative results and therefore treated as normal.

| Analysis | Result Units | Proportion Detected | Proportion "J" Qualified | Average MDL | Minimum Detect | Maximum Detect | Average Result | Std. Dev. | Dist. 95% | UCL | Exposure of Mean | Concentration |
|-----------------------------|--------------|---------------------|--------------------------|-------------|----------------|----------------|----------------|-----------|-----------|---------|------------------|---------------|
| Physical Parameters | | | | | | | | | | | | |
| Nitrate-Nitrite as Nitrogen | mg/kg | 3/ 3 | 0/ 3 | 0.0680 | 0.9230 | 1.4900 | 1.2800 | 0.3139 | D | 1.8100 | 1.4900 | |
| Radionuclides | | | | | | | | | | | | |
| Actinium-228 | pCi/g | 3/ 3 | 0/ 3 | 0.0154 | 0.8360 | 1.0600 | 0.9480 | 0.1120 | D | 1.1400 | 1.0600 | |
| Cesium-137 | pCi/g | 3/ 3 | 0/ 3 | 0.0048 | 0.0154 | 0.0209 | 0.0178 | 0.0028 | D | 0.0225 | 0.0209 | |
| Gross Alpha | pCi/g | 3/ 3 | 0/ 3 | 3.2000 | 3.5200 | 7.8800 | 6.3100 | 2.4225 | D | 10.4000 | 7.8800 | |
| Lead-212 | pCi/g | 3/ 3 | 0/ 3 | 0.0083 | 0.9010 | 1.0800 | 0.9790 | 0.0917 | D | 1.1300 | 1.0800 | |
| Non-volatile Beta | pCi/g | 1/ 3 | 0/ 3 | 5.4000 | 6.3400 | 6.3400 | 4.0700 | 2.0305 | D | 7.4900 | 6.3400 | |
| Potassium-40 | pCi/g | 3/ 3 | 0/ 3 | 0.0424 | 2.1600 | 3.6300 | 3.0800 | 0.8018 | D | 4.4300 | 3.6300 | |
| Radium-226 | pCi/g | 1/ 1 | 0/ 1 | 0.0562 | 0.7680 | 0.7680 | 0.7680 | | D | | 0.7680 | |
| Radium-228 | pCi/g | 1/ 1 | 0/ 1 | 0.1010 | 1.0100 | 1.0100 | 1.0100 | | D | | 1.0100 | |
| Thorium-228 | pCi/g | 1/ 1 | 0/ 1 | 0.1720 | 1.2800 | 1.2800 | 1.2800 | | D | | 1.2800 | |
| Thorium-230 | pCi/g | 1/ 1 | 0/ 1 | 0.0846 | 0.7480 | 0.7480 | 0.7480 | | D | | 0.7480 | |
| Thorium-232 | pCi/g | 1/ 1 | 0/ 1 | 0.0768 | 0.8490 | 0.8490 | 0.8490 | | D | | 0.8490 | |
| Thorium-234 | pCi/g | 1/ 3 | 0/ 3 | 0.2503 | 0.9480 | 0.9480 | 0.4000 | 0.4743 | D | 1.2000 | 0.9480 | |

| Analysis | Result Units | Proportion Detected | Proportion "J" Qualified | Average MDL | Minimum Detect | Maximum Detect | Average Result | Std. Dev. | Dist. 95% | UCL of Mean | Exposure Concentration |
|----------------------------------|--------------|---------------------|--------------------------|-------------|----------------|----------------|----------------|-----------|-----------|-------------|------------------------|
| Uranium-233/234 | pCi/g | 1/ 1 | 0/ 1 | 0.0164 | 0.9440 | 0.9440 | 0.9440 | | D | | 0.9440 |
| Uranium-235 | pCi/g | 1/ 1 | 0/ 1 | 0.0165 | 0.0668 | 0.0668 | 0.0668 | | D | | 0.0668 |
| Uranium-238 | pCi/g | 1/ 1 | 1/ 1 | 0.0065 | 1.1700 | 1.1700 | 1.1700 | | D | | 1.1700 |
| TAL Inorganics | | | | | | | | | | | |
| Aluminum | mg/kg | 3/ 3 | 0/ 3 | 1.88 | 7610.00 | 13700.00 | 11200.00 | 3172.96 | D | 16500.00 | 13700.00 |
| Arsenic | mg/kg | 3/ 3 | 0/ 3 | 0.15 | 1.60 | 2.54 | 2.06 | 0.47 | D | 2.85 | 2.54 |
| Barium | mg/kg | 3/ 3 | 1/ 3 | 0.02 | 25.80 | 27.80 | 26.50 | 1.13 | D | 28.40 | 27.80 |
| Beryllium | mg/kg | 3/ 3 | 3/ 3 | 0.01 | 0.16 | 0.20 | 0.19 | 0.02 | D | 0.23 | 0.20 |
| Calcium | mg/kg | 3/ 3 | 1/ 3 | 0.77 | 481.00 | 663.00 | 590.00 | 96.01 | D | 752.00 | 663.00 |
| Chromium | mg/kg | 3/ 3 | 0/ 3 | 0.04 | 11.20 | 14.10 | 12.70 | 1.45 | D | 15.10 | 14.10 |
| Cobalt | mg/kg | 3/ 3 | 0/ 3 | 0.03 | 1.62 | 1.97 | 1.78 | 0.18 | D | 2.08 | 1.97 |
| Copper | mg/kg | 3/ 3 | 0/ 3 | 0.07 | 16.00 | 31.10 | 21.50 | 8.34 | D | 35.60 | 31.10 |
| Cyanide | mg/kg | 1/ 3 | 1/ 3 | 0.22 | 0.26 | 0.26 | 0.16 | 0.08 | D | 0.30 | 0.26 |
| Iron | mg/kg | 3/ 3 | 3/ 3 | 0.43 | 10800.00 | 11700.00 | 11100.00 | 493.29 | D | 12000.00 | 11700.00 |
| Lead | mg/kg | 3/ 3 | 0/ 3 | 0.03 | 4.78 | 7.65 | 6.34 | 1.45 | D | 8.79 | 7.65 |
| Magnesium | mg/kg | 3/ 3 | 0/ 3 | 0.17 | 190.00 | 221.00 | 203.00 | 16.26 | D | 230.00 | 221.00 |
| TAL Inorganics, continued | | | | | | | | | | | |
| Manganese | mg/kg | 3/ 3 | 0/ 3 | 0.05 | 605.00 | 979.00 | 754.00 | 198.24 | D | 1090.00 | 979.00 |
| Mercury | mg/kg | 3/ 3 | 0/ 3 | 0.02 | 0.19 | 0.37 | 0.26 | 0.09 | D | 0.42 | 0.37 |
| Nickel | mg/kg | 3/ 3 | 0/ 3 | 0.11 | 184.00 | 372.00 | 254.00 | 102.55 | D | 427.00 | 372.00 |
| Potassium | mg/kg | 3/ 3 | 1/ 3 | 0.29 | 196.00 | 243.00 | 223.00 | 24.27 | D | 264.00 | 243.00 |
| Selenium | mg/kg | 3/ 3 | 3/ 3 | 0.07 | 0.28 | 0.42 | 0.36 | 0.07 | D | 0.47 | 0.42 |
| Silver | mg/kg | 2/ 3 | 2/ 3 | 0.03 | 0.11 | 0.29 | 0.14 | 0.14 | D | 0.37 | 0.29 |
| Sodium | mg/kg | 3/ 3 | 0/ 3 | 1.46 | 174.00 | 669.00 | 404.00 | 249.28 | D | 825.00 | 669.00 |
| Thallium | mg/kg | 1/ 3 | 1/ 3 | 0.13 | 0.69 | 0.69 | 0.28 | 0.36 | D | 0.89 | 0.69 |
| Vanadium | mg/kg | 3/ 3 | 0/ 3 | 0.02 | 24.40 | 26.70 | 25.30 | 1.21 | D | 27.40 | 26.70 |
| Zinc | mg/kg | 3/ 3 | 0/ 3 | 0.05 | 19.80 | 28.60 | 22.90 | 4.92 | D | 31.20 | 28.60 |
| TCL Volatiles | | | | | | | | | | | |
| 1,1,1-Trichloroethane | mg/kg | 1/ 3 | 1/ 3 | 0.0002 | 0.0006 | 0.0006 | 0.0002 | 0.0003 | D | 0.0007 | 0.0006 |
| 2-Butanone (MEK) | mg/kg | 1/ 3 | 0/ 3 | 0.0021 | 0.0090 | 0.0090 | 0.0037 | 0.0046 | D | 0.0115 | 0.0090 |

| Analysis | Result Units | Proportion Detected | Proportion "J" Qualified | Average MDL | Minimum Detect | Maximum Detect | Average Result | Std. Dev. | Dist. 95% of Mean | UCL | Exposure Concentration |
|--------------------------------------|--------------|---------------------|--------------------------|-------------|----------------|----------------|----------------|-----------|-------------------|--------|------------------------|
| Acetone | mg/kg | 2/ 3 | 0/ 3 | 0.0022 | 0.0114 | 0.1370 | 0.0498 | 0.0757 | D | 0.1770 | 0.1370 |
| Benzene | mg/kg | 3/ 3 | 2/ 3 | 0.0003 | 0.0023 | 0.0077 | 0.0041 | 0.0031 | D | 0.0093 | 0.0077 |
| Chloroform | mg/kg | 1/ 3 | 1/ 3 | 0.0002 | 0.0009 | 0.0009 | 0.0004 | 0.0005 | D | 0.0012 | 0.0009 |
| Chloromethane (Methyl chloride) | mg/kg | 1/ 3 | 1/ 3 | 0.0004 | 0.0016 | 0.0016 | 0.0007 | 0.0008 | D | 0.0020 | 0.0016 |
| Dichloromethane (Methylene chloride) | mg/kg | 2/ 3 | 2/ 3 | 0.0003 | 0.0078 | 0.0215 | 0.0098 | 0.0108 | D | 0.0281 | 0.0215 |
| Toluene | mg/kg | 2/ 3 | 2/ 3 | 0.0002 | 0.0004 | 0.0005 | 0.0003 | 0.0002 | D | 0.0007 | 0.0005 |

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| Analysis | Result Units | Proportion Detected | Proportion "J" Qualified | Average MDL | Minimum Detect | Maximum Detect | Average Result | Std. Dev. | Dist. 95% of Mean | UCL | Exposure Concentration |
|----------------------------|--------------|---------------------|--------------------------|-------------|----------------|----------------|----------------|-----------|-------------------|---------|------------------------|
| Physical Parameters | | | | | | | | | | | |
| Ammonia nitrogen | ug/L | 1/ 3 | 1/3 | 28.00 | 40.00 | 40.00 | 22.70 | 15.01 | D | 48.00 | 40.00 |
| Total Phosphates (as P) | ug/L | 3/ 3 | 1/3 | 25.00 | 120.00 | 1550.00 | 623.00 | 803.51 | D | 1980.00 | 1550.00 |
| Radionuclides | | | | | | | | | | | |
| Gross Alpha | pCi/L | 1/ 3 | 0/3 | 1.20 | 3.95 | 3.95 | 1.74 | 1.92 | D | 4.97 | 3.95 |
| Non-volatile Beta | pCi/L | 3/ 3 | 0/3 | 1.89 | 3.61 | 11.10 | 6.42 | 4.08 | D | 13.30 | 11.10 |
| TAL Inorganics | | | | | | | | | | | |
| Aluminum | ug/L | 2/ 3 | 0/3 | 37.60 | 196.00 | 4350.00 | 1520.00 | 2451.07 | D | 5650.00 | 4350.00 |
| Antimony | ug/L | 2/ 3 | 2/3 | 1.64 | 1.14 | 2.50 | 1.49 | 0.89 | D | 2.99 | 2.50 |
| Barium | ug/L | 3/ 3 | 0/3 | 0.33 | 16.50 | 20.60 | 18.30 | 2.11 | D | 21.80 | 20.60 |
| Beryllium | ug/L | 1/ 3 | 1/3 | 0.22 | 0.19 | 0.19 | 0.14 | 0.05 | D | 0.21 | 0.19 |

| Analysis | Result Units | Proportion Detected | Proportion "J" Qualified | Average MDL | Minimum Detect | Maximum Detect | Average Result | Std. Dev. | 95% Dist. | UCL | Exposure of Mean Concentration |
|--------------------------|--------------|---------------------|--------------------------|-------------|----------------|----------------|----------------|-----------|-----------|-----------|--------------------------------|
| Boron, total recoverable | ug/L | 3/ 3 | 0/3 | 19.10 | 9530.00 | 68800.00 | 29500.00 | 34027.79 | D | 86900.00 | 68800.00 |
| Calcium | ug/L | 3/ 3 | 0/3 | 15.40 | 2890.00 | 5340.00 | 4480.00 | 1381.17 | D | 6810.00 | 5340.00 |
| Chromium | ug/L | 1/ 3 | 0/3 | 0.73 | 5.70 | 5.70 | 2.14 | 3.08 | D | 7.34 | 5.70 |
| Cobalt | ug/L | 1/ 3 | 1/3 | 0.67 | 2.25 | 2.25 | 0.97 | 1.11 | D | 2.84 | 2.25 |
| Copper | ug/L | 3/ 3 | 2/3 | 1.32 | 3.73 | 166.00 | 57.80 | 93.66 | D | 216.00 | 166.00 |
| Iron | ug/L | 3/ 3 | 0/3 | 8.63 | 941.00 | 6270.00 | 2760.00 | 3042.93 | D | 7890.00 | 6270.00 |
| Lead | ug/L | 1/ 3 | 0/3 | 0.68 | 8.24 | 8.24 | 2.97 | 4.56 | D | 10.70 | 8.24 |
| Magnesium | ug/L | 3/ 3 | 0/3 | 3.33 | 424.00 | 722.00 | 617.00 | 167.62 | D | 900.00 | 722.00 |
| Manganese | ug/L | 3/ 3 | 0/3 | 0.90 | 88.20 | 878.00 | 359.00 | 449.55 | D | 1120.00 | 878.00 |
| Mercury | ug/L | 1/ 3 | 0/3 | 0.10 | 3.47 | 3.47 | 1.19 | 1.97 | D | 4.52 | 3.47 |
| Nickel | ug/L | 3/ 3 | 0/3 | 2.27 | 54.70 | 267.00 | 126.00 | 121.83 | D | 332.00 | 267.00 |
| Potassium | ug/L | 3/ 3 | 0/3 | 5.87 | 3630.00 | 4730.00 | 4340.00 | 613.30 | D | 5370.00 | 4730.00 |
| Silver | ug/L | 1/ 3 | 0/3 | 0.62 | 4.69 | 4.69 | 1.77 | 2.53 | D | 6.03 | 4.69 |
| Sodium | ug/L | 3/ 3 | 0/3 | 29.10 | 55700.00 | 226000 .00 | 113000.0 | 97949.63 | D | 278000.00 | 226000.00 |
| | | | | | | | 0 | | | | |
| Vanadium | ug/L | 3/ 3 | 2/3 | 0.43 | 1.17 | 25.70 | 9.44 | 14.08 | D | 33.20 | 25.70 |
| Zinc | ug/L | 2/ 3 | 0/3 | 0.97 | 14.30 | 68.40 | 27.70 | 35.89 | D | 88.20 | 68.40 |
| TCL Volatiles | | | | | | | | | | | |
| 2-Butanone (MEK) | ug/L | 1/ 3 | 1/3 | 2.12 | 0.74 | 0.74 | 0.95 | 0.18 | D | 1.26 | 0.74 |
| Acetone | ug/L | 3/ 3 | 1/3 | 2.24 | 4.00 | 6.84 | 5.42 | 1.42 | D | 7.81 | 6.84 |

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